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080CT03 E84274-2 D02000  
P01/7700 0.00-0323437.4

7 OCT 2003

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



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Cardiff Road  
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1. Your reference

MCM/CVB/25954

2. Patent application number

(The Patent Office will fill in this part)

0323437.4

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Helmet Integrated Systems Limited  
Unit 3, Focus 4  
Fourth Avenue  
Letchworth  
Hertfordshire SG6 2TU

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

08569824001

4. Title of the invention

Two piece helmet

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

MATHYS & SQUIRE  
100 Gray's Inn Road  
London WC1X 8AL  
United Kingdom

Patents ADP number (if you know it)

1081001 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

YES

# Patents Form 1/77

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Continuation sheets of this form

Description	6 ✓
Claim(s)	2 ✓
Abstract	1 ✓ <i>gmm</i>
Drawing(s)	4 <i>xx gmm</i>

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Date 7/10/03

MATHYS & SQUIRE

12. Name and daytime telephone number of person to contact in the United Kingdom

Michael C Moir - 020 7830 0000

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### Protective Helmet

The present invention relates to protective helmets, and in particular to firefighters' helmets.

Existing firefighters' helmets comprise a protective outer shell made from impact-resistant plastics or the like which is intended to protect the wearer from falling debris which often is a hazard of burning buildings. To protect the wearer also from the heat and sparks emitted from a fire, the helmet includes a visor and neck protector to protect the head, face and neck of the wearer.

There are cases where the full protective effect of a firefighting helmet is not required. For example, firefighters have to provide a rescue service at other emergencies in which there is no fire. Then a large firefighting helmet may be inconvenient, but head protection is still necessary. In particular, in the case of road traffic accidents, when a firefighter may need to work in a confined space eg. within a damaged vehicle, the large helmet may be an impediment. In these cases, it is often found that firefighters will simply remove their helmets, exposing themselves to unnecessary danger. The preferred embodiments of this invention seek to provide a solution to this problem.

There is provided as a first aspect of the present invention a protective helmet comprising an inner protective shell configured to be worn on its own as a helmet and an outer protective shell configured to be fitted over the inner shell and releasably retained thereon.

The first shell may be worn alone where there is not clearance for a large helmet, such as in road traffic accidents; or where a large helmet might be more cumbersome than protective.

There is provided as a second aspect of the present invention a helmet which can be worn alone or under an outer helmet, comprising a protective shell and configured to have secured over it an outer protective shell.

This helmet may be worn alone when a full helmet is not required, but where impact protection is advisable, and a further protective shell may be attached to the outside whilst the helmet is being worn. Thus the user can change to full fire protection without the need to change helmets, and without leaving his head unprotected at any time.

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The invention also provides an outer helmet for use with an inner helmet as set forth above, and comprising an outer shell having inner dimensions large enough to accommodate an inner shell itself wearable as a helmet and means for releasably locking the outer shell to the inner shell.

10 Preferably the outer shell has an outwardly extending brim or cape.

15 Preferably there are means for spacing the outer shell from the inner shell. This can provide additional protection against penetration or denting by impacting objects; an object impacting the outer shell will dissipate energy in doing so, and may be arrested before reaching the inner shell. The use of an outer shell spaced from the inner shell also provides an air gap which increases the thermal insulation afforded to the firefighter against heat from the fire.

The helmet may comprise a visor which is stored between the inner and outer shells when not in use.

20 The helmet preferably comprises means for attaching at least one accessory to the helmet. The accessories may be attached on the inner or outer helmet or both and can include neck curtains, torches, etc.

25 ~~The helmet preferably comprises retaining means for retaining the inner shell in the outer shell, wherein the retaining means is moveable between a first position in which the retaining means engages a said shell substantially to prevent relative movement between the two shells; and a second position in which the retaining means does not engage with a said shell, allowing relative movement of the shells.~~

The retaining means is preferably biased towards the first position and is preferably moveable by a user whilst wearing the inner shell in order to move it from the first to the second position for allowing the introduction or removal of the outer shell on or off the inner shell.

5 The retaining means may be oriented so that when the outer shell is placed onto the inner shell, the retaining means automatically engages a said shell.

Preferably the retaining means is adapted to be released to enable the outer shell to be removed from the inner shell without disturbing the inner shell.

10 Embodiments of the invention are now described purely by way of example and with reference to the following figures:

Figure 1A shows the outer helmet;

Figure 1B shows the inner helmet;

Figures 2A and 2B show front and side views of the helmet shells assembled together;

15 Figure 3 shows an inside view of the inner shell when locked into the outer helmet shell; and

Figures 4 to 7 show outer helmet shells with provision for various detachable accessories and ancillary equipment.

20 Figures 1A and B show a firefighter's helmet comprising separate inner and outer shells. The inner shell of Figure 1B (generally denoted as 10) is wearable on its own as an impact-resisting helmet. It comprises an outer protective moulding 12 of glass fibre-reinforced plastics or other impact-resisting plastics within which is a further impact resisting layer as known per se. The shell 10 is worn by the user by means of a net cap or liner having a headband 14 and chinstrap 16. There is  
25 also an ocular protector 18 to protect the firefighter's eyes when only the inner shell is being worn. The outer shell of Figure 1A (generally denoted as 20) comprises a protective moulding 22 of glass fibre reinforced plastics or other impact-resisting plastics material. It has a large enough interior to accommodate

the inner shell 10. It also has retaining clips 26 to hold the outer shell onto the inner shell. The outer shell has a full visor 24 to protect the firefighter's face from flying debris and from radiant heat. The visor 24 is pivotally mounted at the sides of the outer shell 20 by means of links 28, 30 pivotally connected to the moulding

5 ~~22 and the visor 24. Together with the distances between the pivots on the visor~~  
and between the pivots on the moulding, the links 28, 30 form a four-bar linkage which enables the visor to move between a deployed position in which it covers the wearer's face, and a stowed position (fig. 2B) in which it is retracted between the inner and outer shells. The use of a four-bar linkage enables the relatively  
10 large visor 24 to move along a path close to the surface of the inner helmet. Thereby the outer shell can fit compactly over it. The ocular shield 18 may also be pivotable on a four-bar linkage for storage within the inner shell. However because the shield is shallower, a single-point pivot may suffice.

15 As can be seen from the arrows linking Figures 1A and 1B, the outer shell is fitted over the inner shell and the retaining clips 26 lock the shells together. The shells in their locked-together state are shown in Figures 2A and 2B. Figure 2A shows a front view of the shells when locked together. The figure shows the outer shell 20 in section and the inner shell 10 in full. ~~Figure 2B shows a side view of the~~  
20 shells locked together with the visor 24 of the outer shell 20 in a stowed position between the two shells (10,20).

The rim 32 of the inner shell 12 engages pads (not shown) on the inner surface of the outer shell 22 around the greater part of its circumference, except at the front where a gap is provided to permit the passage of the visor 24. A further pad or pads (not shown) is provided in the comb 34 so that when the outer shell is  
25 pulled down on to the inner shell and the retaining clip 26 engaged the outer shell ~~is firmly located on the inner shell~~ with a gap of approximately 6mm between them.

Referring to figure 3, each retaining clip 26 is disposed in a housing 27 and  
30 ~~biased outwardly~~ by a spring (not shown). The clip 26 can be pressed into its housing 27 in order to allow the inner helmet 10 to slide past the clip 26 into the

outer helmet 20. The clip 26 is tapered in such a way that the sliding of the outer helmet onto the inner helmet has the effect of pressing the clip in so that it does not need to be pressed-in manually when the helmets are fully together, the spring returns the clip 26 to a protruding position to hold the shells in place. The orientation of the shells can be seen via the relative positioning of the ocular protector 18 and the visor 24 (which are aligned with each other).

Also visible in figure 3 is a net cap 34 forming the suspension of the helmet on the wearer's head. The net 34 is adjustable as known per se to fit the helmet comfortably to the wearer's head in the correct position. In particular an adjustable nape pad 36 in combination with the chin strap 16 and an adjustable forehead pad 38 locates the helmet-fore-and-aft so that the ocular shield 18 and the visor 24 are properly positioned.

Figure 4 shows an embodiment of the helmet which has a slot 40 for mounting breathing apparatus, and an external lever 41 for moving the visor 24 between its stowed and deployed positions. Alternatively, if the bottom edge of the visor 24 projects from the outer shell when stowed so as to be graspable by a firefighter's gloved hand, the lever 41 can be omitted.

Figure 5 shows a neck curtain 42 attached to the outer shell 20, to provide additional protection against falling ash or embers.

Figure 6 shows an embodiment of the helmet which has a mounting for a torch 44.

Figure 7 shows a fold out hook loop 46 of the outer shell of the helmet in use to hang the helmet.

Provision may instead or in addition be made on the inner helmet for mounting accessories, and though it may not be possible to fit the outer helmet over it when the accessories are in place.



Each feature disclosed in this specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features. Statements in this specification of the "objects of the invention" relate to preferred embodiments of the invention, but  
5 ~~not necessarily to all embodiments of the invention falling within the claims.~~ The description of the invention with reference to the drawings is by way of example only.

**Claims**

1. A helmet which can be worn alone or under an outer helmet, comprising a protective shell and configured to have secured over it an outer protective shell.
- 5 2. An outer helmet for use with an inner helmet as claimed in claim 1, comprising an outer shell having inner dimensions large enough to accommodate an inner shell itself wearable as a helmet and means for releasably locking the outer shell to the inner shell.
- 10 3. A protective helmet comprising an inner protective shell configured to be worn on its own as a helmet and an outer protective shell configured to be fitted over the inner shell and releasably retained thereon.
4. A helmet as claimed in claim 2 or claim 3, wherein the outer shell has an outwardly extending brim or cape.
- 15 5. A helmet according to any of claims 2 to 4, comprising means for spacing the outer shell from the inner shell.
6. A helmet according to any of claims 2 to 5, comprising a visor which is accommodated between the inner and outer shells when not in use.
- 20 7. A helmet according to any preceding claim, comprising retaining means for retaining the inner shell in the outer shell, wherein the retaining means is moveable between a first position in which the retaining means engages a said shell substantially to prevent relative movement between the two shells; and a second position in which the retaining means does not engage with a said shell, allowing relative movement of the shells.
- 25 8. A helmet according to claim 7, wherein the retaining means is biased towards the first position.

9. A helmet according to claim 7 or 8, wherein the retaining means is moveable by a user whilst wearing the inner shell in order to move it from the first to the second position for allowing the introduction or removal of the outer shell on to or off the inner shell.
- 

- 5 10. A helmet according to claim 7, 8 or 9, wherein the retaining means is oriented so that when the outer shell is placed onto the inner shell, the retaining means automatically engages a said shell.
- 10 11. A helmet according to any of claims 7 to 10, wherein the retaining means is adapted to be released to enable the outer shell to be removed from the inner shell without disturbing the inner shell.
12. A helmet according to any preceding claim, comprising means for attaching at least one accessory to the helmet.
13. A helmet substantially as herein described with reference to the accompanying drawings.

## **Abstract**

A protective helmet comprising an inner protective shell configured to be worn on its own as a helmet and an outer protective shell configured to be fitted over the inner shell and releasably retained thereon.

5 Publish figures 1A and 1B

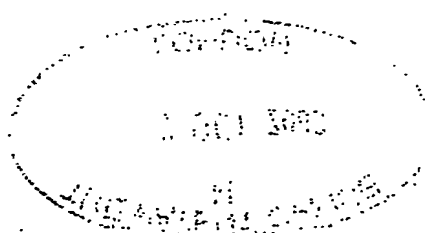


FIG 1A

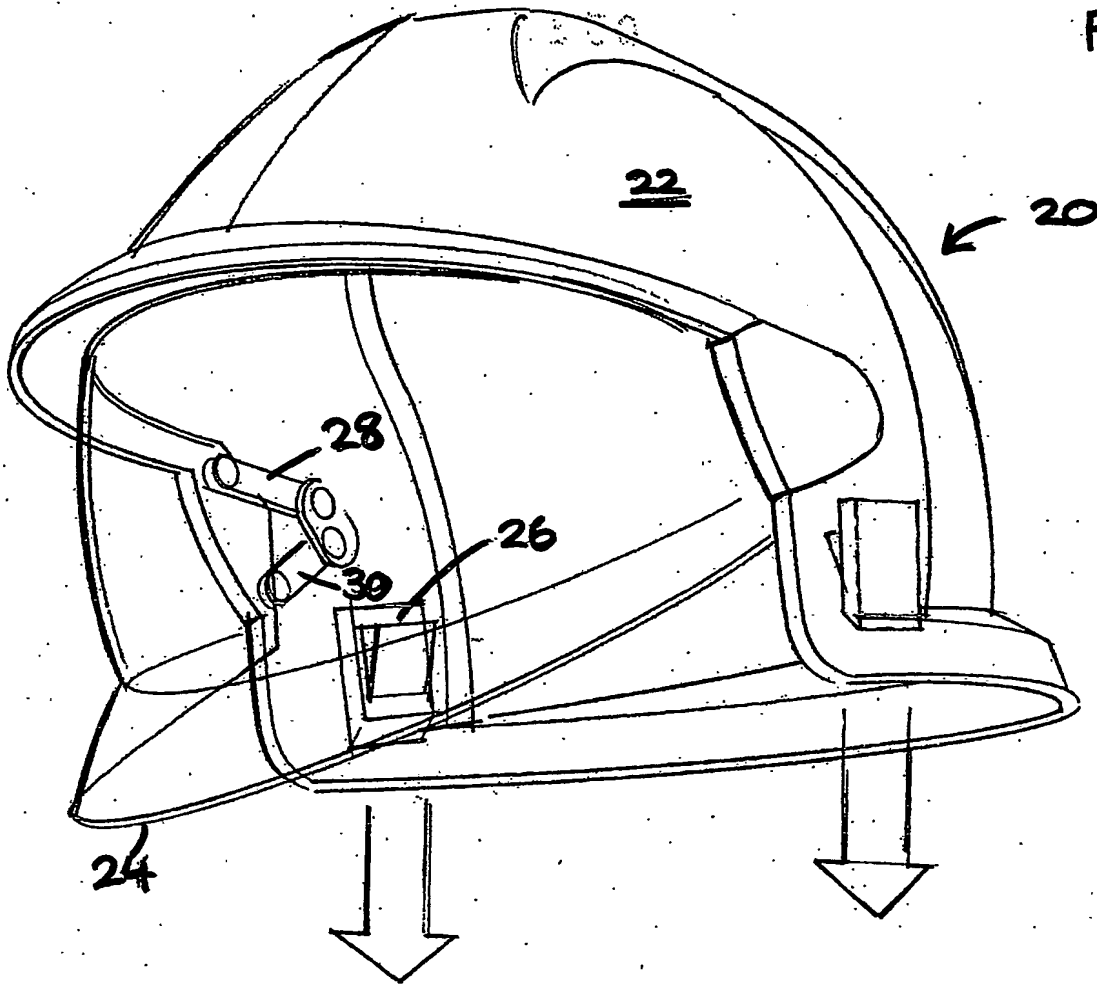
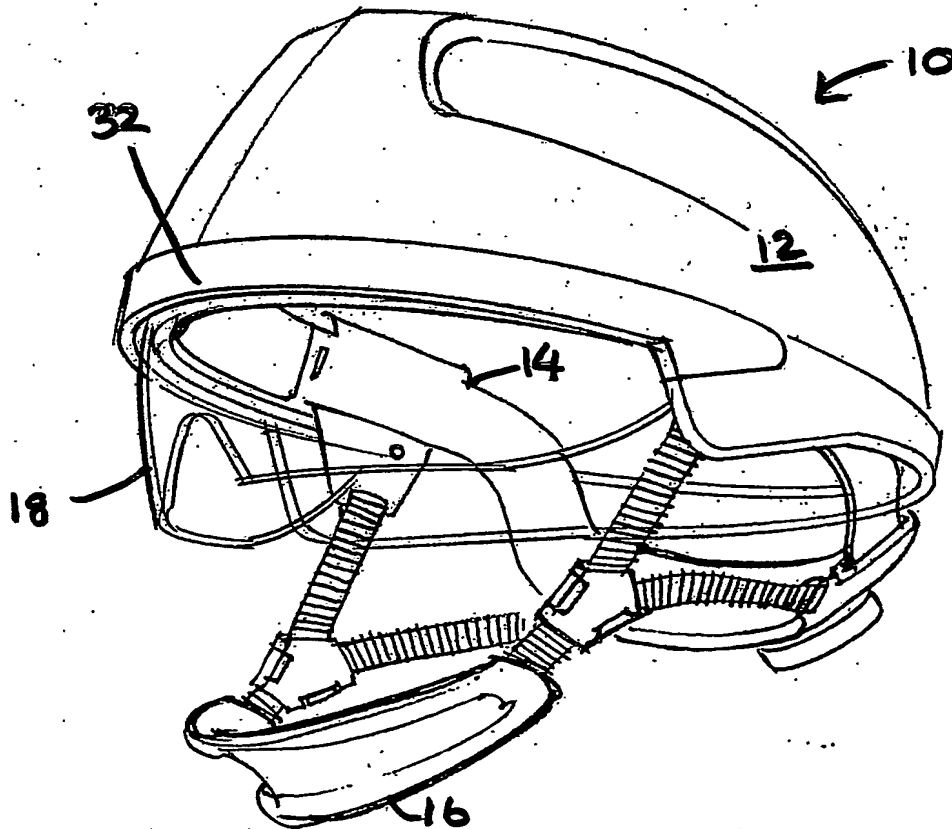


FIG 1B



38A5526

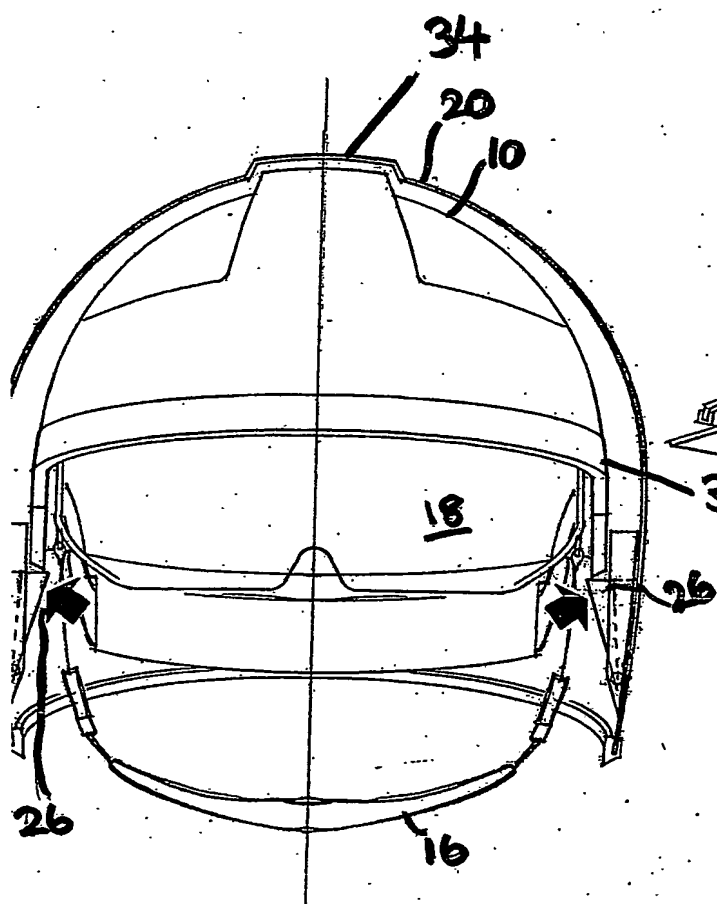


FIG 2A

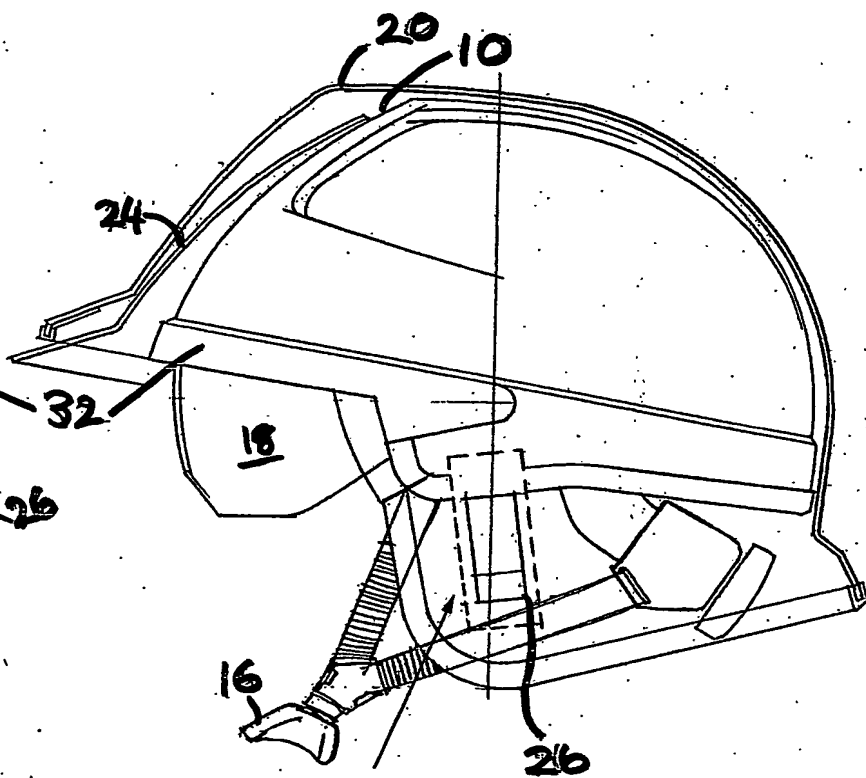


FIG 2B

FIG. 3

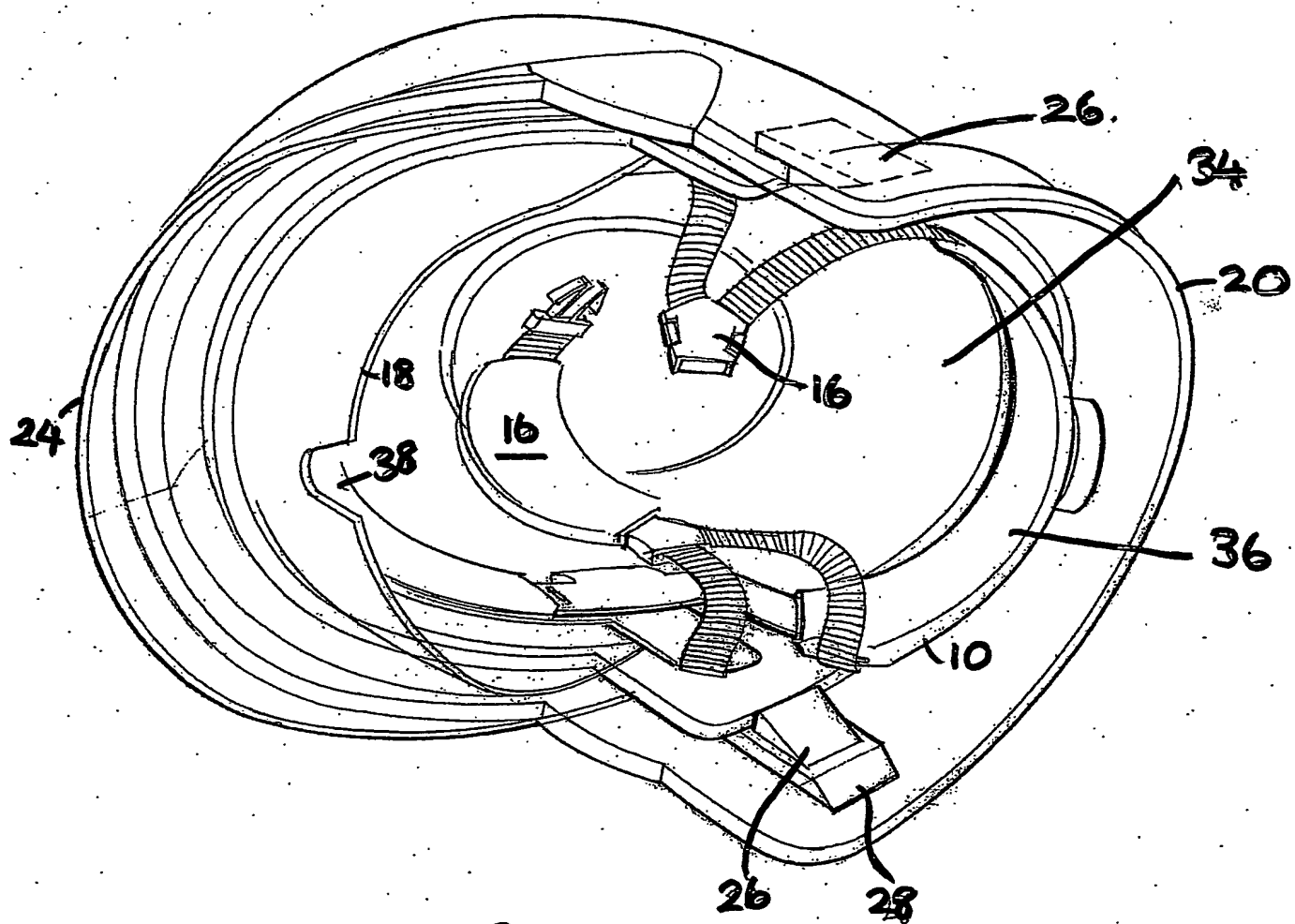
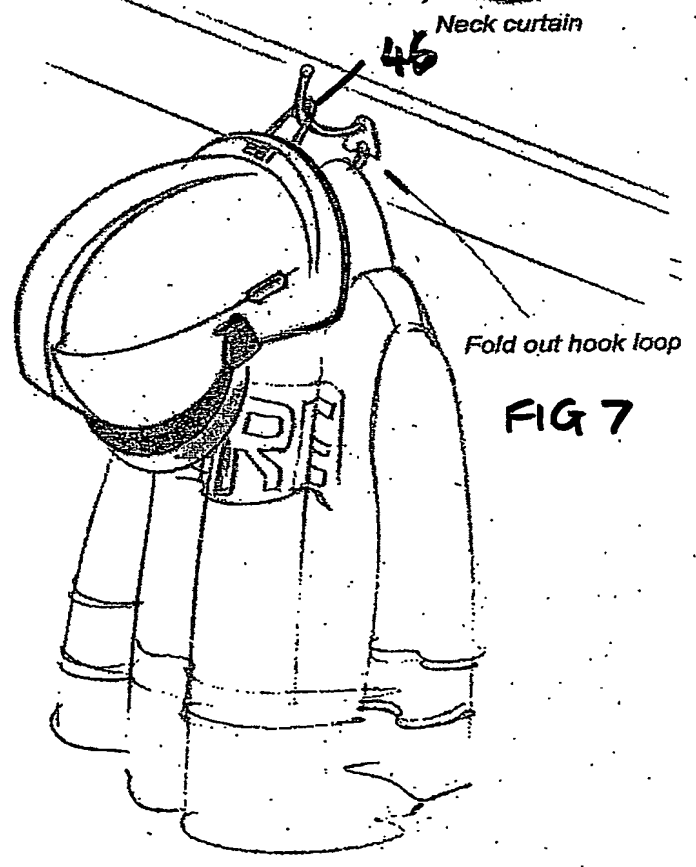
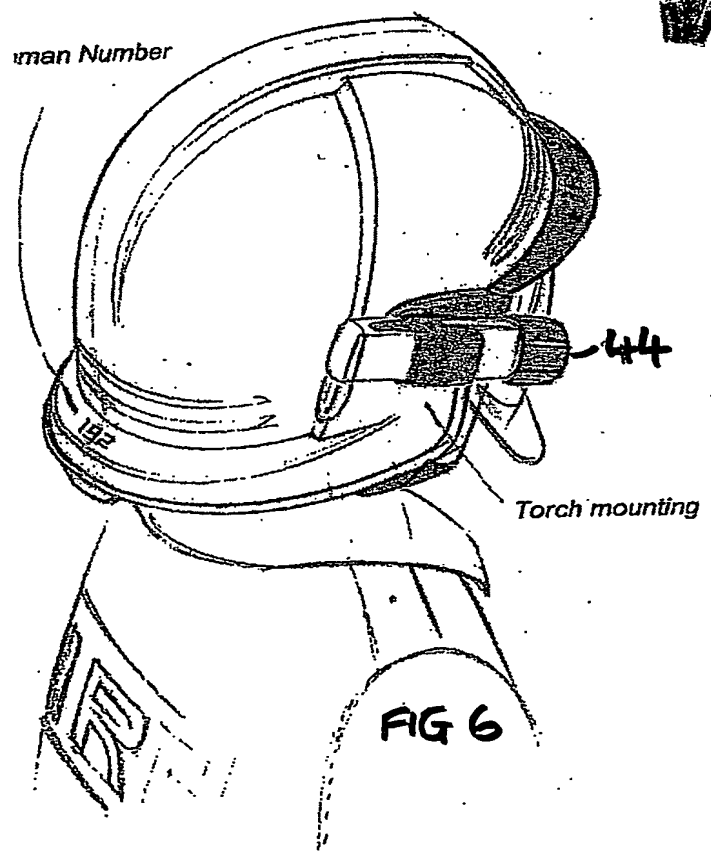
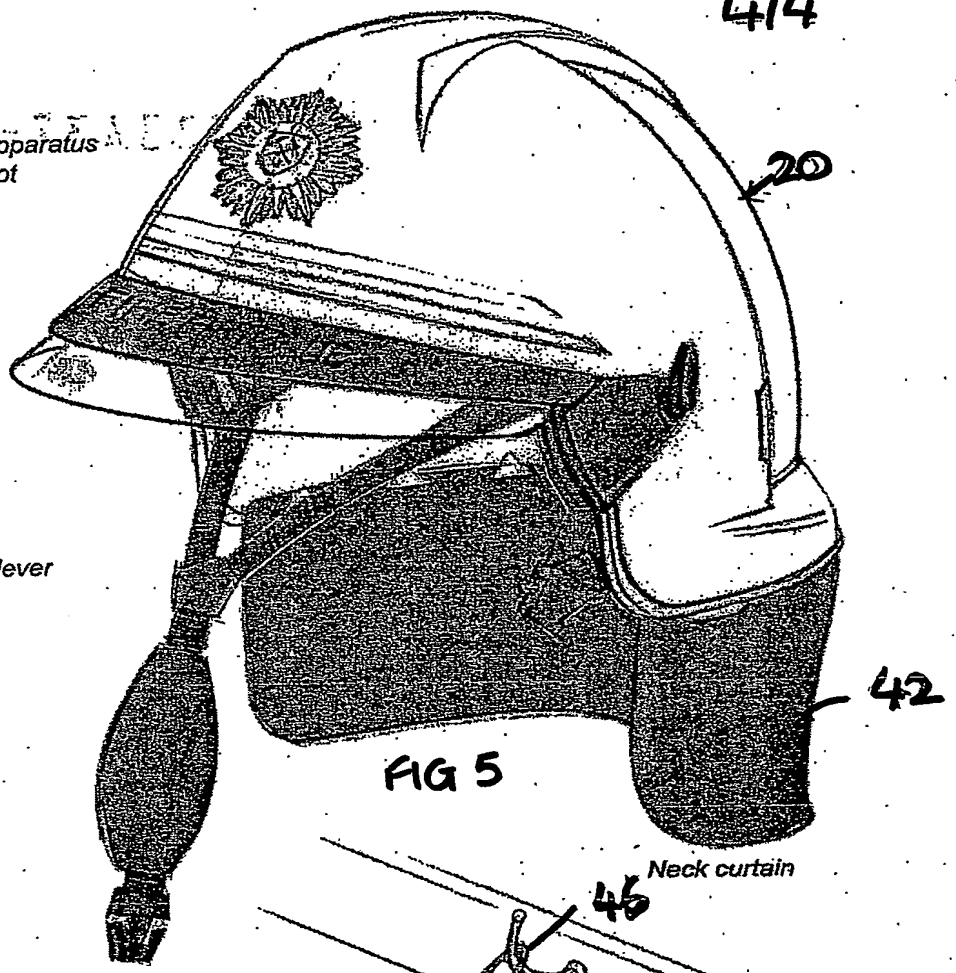
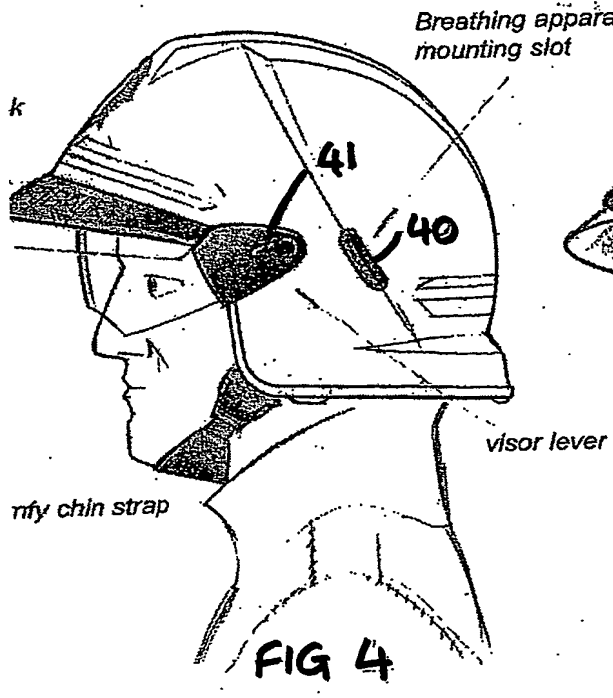


FIG 3





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